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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/337,278 06/22/99 HIROOKA

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EXAMINER

SMETANA, J

ART UNIT

PAPER NUMBER

1746

7

DATE MAILED:

10/09/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/337,278

Applicant(s)

HIROOKA ET AL.

Examiner

Jiri F. Smetana

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 August 2001.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5 and 7-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5 and 7-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 June 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al., U.S. Patent no. 6,167,583, in view of Kanno, U.S. Patent No. 5,873,380.

Miyashita discloses a cleaning method of an electronic component wherein an object to be cleaned is cleaned by bringing a sponge member into contact with the object to be cleaned (column 1, lines 34-42) while supplying, to the object to be cleaned, water having a resistivity value of about 5 MΩ to 18MΩ (column 1, lines 22-25).

Miyashita does not disclose wherein the resistivity of cleaning water is adjusted by including carbon dioxide gas into the cleaning water. However, Kanno discloses wherein the resistivity of cleaning water is adjusted by including carbon dioxide gas into the cleaning water (column 7, lines 11-20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the resistivity of the cleaning water by including carbon dioxide gas because Kanno teaches that damage of a wafer may be reduced by reducing the resistivity of pure water by mixing a carbon dioxide gas with the water, thereby reducing the static charge generated on the surface of the wafer (column 1, lines 38-41).

As to claim 1, since the prior art of Miyashita teaches a “resistivity of about 5 MΩ to 18MΩ” (column 1, lines 22-23), such range of “about 5 MΩ to 18MΩ” allows for lower resistivities, thus the ranges overlap. *In re Geisler*, 116 F.3d 1465, 1469-71, 43 USPQ2d 1362, 1365-66 (Fed. Cir. 1997). Further, a prima facie case of obviousness exists where the claimed range and prior art range do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America V. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

With respect to claim 5, it would have been obvious to clean ceramic wafers because both Miyashita and Kanno teach cleaning methods of generalized wafers or semiconductor devices, including ceramic or silicon.

3. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al., U.S. Patent no. 6,167,583, and Kanno, U.S. Patent No. 5,873,380, in view of Takehiko et al., JP 04-206724.

Miyashita discloses a cleaning method of an electronic component wherein an object to be cleaned is cleaned by bringing a sponge member into contact with the object to be cleaned (column 1, lines 34-42) while supplying, to the object to be cleaned, water having a resistivity value of about 5 MΩ to 18MΩ (column 1, lines 22-25).

Miyashita does not disclose wherein the resistivity of cleaning water is adjusted by including carbon dioxide gas into the cleaning water. However, Kanno discloses wherein the resistivity of cleaning water is adjusted by including carbon dioxide gas into the cleaning water (column 7, lines 11-20). Further, Takehiko discloses wherein the resistivity of water is 0.1 to 3.0 MΩ (abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the resistivity of the cleaning water by including carbon dioxide gas of a resistivity value of less than 5 MΩ because Kanno teaches that damage of a wafer may be reduced by reducing the resistivity of pure water by mixing a carbon dioxide gas with the water, thereby reducing the static charge generated on the surface of the wafer (column 1, lines 38-41) and Takehiko teaches that such low resistivity prevents electrification of a wafer during cleaning and prevents foreign matter from attaching to the wafer (abstract).

With respect to claim 5, it would have been obvious to clean ceramic wafers because both Miyashita, Kanno, and Takehiko teach cleaning methods of generalized wafers or semiconductor devices, including ceramic or silicon.

4. Claims 3, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita and Kanno as applied to claims 1 and 5 above, in view of Simmons et al., U.S. Patent No. 5,693,148.

Neither Miyashita nor Kanno disclose wherein the sponge member is separated from the object to be cleaned during cleaning, and cleaning water supplied also to the separated sponge. However, Simmons discloses wherein the sponge member is separated from the object to be cleaned during cleaning, and cleaning water supplied also to the separated sponge (column 3, lines 10-19; column 4, lines 3-6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to separate the sponge member from the object to be cleaned during cleaning, and supplying cleaning water to the separated sponge because Simmons teaches that cleaning contaminants from the brush/sponge causes contaminants to be repelled from the brush/sponge,

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thus reducing or even eliminating brush/sponge load-up (column 2, lines 11-18), thus extending the useful lifetime of the brush/sponge (column 3, lines 1-2).

5. Claims 3, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita, Kanno, and Takehiko as applied to claims 1 and 5 above, in view of Simmons et al., U.S. Patent No. 5,693,148.

Neither Miyashita, Kanno, nor Takehiko disclose wherein the sponge member is separated from the object to be cleaned during cleaning , and cleaning water supplied also to the separated sponge. However, Simmons discloses wherein the sponge member is separated from the object to be cleaned during cleaning , and cleaning water supplied also to the separated sponge (column 3, lines 10-19; column 4, lines 3-6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to separate the sponge member from the object to be cleaned during cleaning , and supplying cleaning water to the separated sponge because Simmons teaches that cleaning contaminants from the brush/sponge causes contaminants to be repelled from the brush/sponge, thus reducing or even eliminating brush/sponge load-up (column 2, lines 11-18), thus extending the useful lifetime of the brush/sponge (column 3, lines 1-2).

6. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita, Kanno, and Simmons as applied to claims 1, 3, 5, 7, and 8 above, in view of Chung et al., U.S. Patent No. 5,336,371.

Neither Miyashita, Kanno, nor Simmons disclose wherein the object to be cleaned is soaked in cleaning water having the resistivity value of 10 MΩ or less before cleaning.

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However, Chung discloses wherein the object to be cleaned is soaked in cleaning water before cleaning (column 2, lines 54-62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to soak the object to be cleaned in cleaning water before cleaning because Chung teaches that after a photolithography process and stripping of the photoresist, the photoresist stripper must be removed from the wafer by a process such as rinsing before further wafer processing (column 1, lines 23-25; column 3, lines 50-52).

7. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita, Kanno, Simmons, Takehiko as applied to claims 1, 3, 5, 7, and 8 above, in view of Chung et al., U.S. Patent No. 5,336,371.

Neither Miyashita, Kanno, Simmons, nor Takehiko disclose wherein the object to be cleaned is soaked in cleaning water having the resistivity value of 10 MΩ or less before cleaning. However, Chung discloses wherein the object to be cleaned is soaked in cleaning water before cleaning (column 2, lines 54-62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to soak the object to be cleaned in cleaning water before cleaning because Chung teaches that after a photolithography process and stripping of the photoresist, the photoresist stripper must be removed from the wafer by a process such as rinsing before further wafer processing (column 1, lines 23-25; column 3, lines 50-52).

Response to Arguments

8. Applicant's arguments filed 9 August 2001 have been fully considered but they are not persuasive.

9. Applicant argues that Miyashita fails to disclose the use of superpure water having a resistivity of $5M\Omega$ or less. However, as explained above, the resistivity range of the prior art of Miyashita overlaps with that of the claimed invention. Further, the additional rejection of claims 1 and 5 as being unpatentable over Miyashita and Kanno in view of Takehiko explicitly overlap the resistivity of Applicant's range.

10. Applicant argues that neither Miyashita nor Kanno teach wherein the sponge member is brought into contact with the object or wafer to be cleaned. However, Miyashita clearly discloses wherein the sponge member is brought into contact with the object to be cleaned (column 1, lines 34-42; column 3, lines 33-42).

11. Applicant argues Simmons does not disclose to separate the sponge member from the object to be cleaned during cleaning of the object. However, when the sponge is "separated from said object to be cleaned during cleaning", the sponge itself is being cleaned during a cleaning cycle. Therefore, Simmons meets the claim that the sponge is separated during "cleaning".

12. Applicant argues that Chung does not conduct any further cleaning steps and that one of ordinary skill in the art would not be motivated to soak the object to be cleaned in cleaning water before cleaning with a sponge member. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Chung teaches that the object to be cleaned is soaked in cleaning water. It would have been obvious to soak the object to be cleaned in cleaning water before cleaning because Chung teaches that after a photolithography process and stripping of the photoresist, the photoresist

stripper must be removed from the wafer by a process such as rinsing before further wafer processing (column 1, lines 23-25; column 3, lines 50-52). Removal of the photoresist stripper is conventionally undergone in semiconductor processing by rinsing or soaking (column 1, lines 14-33).

Response to Amendment

13. Rejection of claims 1-8 under 35 U.S.C. 112, first paragraph, is withdrawn pursuant to Applicant's amendment.
14. Rejection of claims 1-10 under 35 U.S.C. 112, second paragraph, is withdrawn pursuant to Applicant's amendment.
15. Rejection of claim 1 under 35 U.S.C. 101, is withdrawn pursuant to Applicant's amendment.
16. Claims 2, 4, and 6 have been cancelled per Applicant's request (Amendment A, Paper No. 6).
17. Claims 1, 3, 5, and 7-10 are rejected as stated above.

Conclusion

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jiri F. Smetana whose telephone number is (703)605-1173. The examiner can normally be reached on Monday-Friday (7:30am-4:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy P. Gulakowski can be reached on (703)608-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-7718 for regular communications and (703)305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

Jiri F. Smetana
Patent Examiner
Art Unit 1746

jfs
October 1, 2001



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